

COLLECTION AND EXAMINATION OF DUST

Wind-borne dusts are of interest to geologists for the light they throw on the rate of deposition of loess, and on the character of minerals supposed to be of aeolian origin. For the solution of these problems it is desirable to know the quantity of dust precipitated per unit area, especially in rain and snow, and the relative quantity of different sizes. The best plan for making this determination is to measure off a square yard or square meter, and brush up the dust, if dry, or to shovel up all the dust-bearing layer of snow or sleet. Rain with dust is best taken from the ordinary Weather Bureau rain gage.

To determine the soluble materials in a dustfall, and these are important in estimating how fast potassium and other natural fertilizers are being added to eastern soils by air transport from the arid West, it is essential not to filter the rain and melted snow, but to evaporate them.

The samples collected for weighing and sizing, will also serve for mineralogical and chemical analysis, if carefully

handled. The identification of diatom tests, and other organic materials can also be made on the same material. For the detection of viable spores, it is best to notify specialists in plant pathology, so that they may go into the field before the dustfall disappears and secure uncontaminated material for incubation.

LITERATURE THAT MAY BE CONSULTED

- (1) Free, E. E. The movement of soil material by the wind. U.S. Bur. of Soils, Bull. 68, Washington, 1911. Contains extensive bibliography.
- (2) Twenhofel, W. H. Treatise on sedimentation. Baltimore.
- (3) Winchell & Miller. The dustfall of March 9, 1918. *Am. Jour. Sc.*, v. 46, 1918, pp. 599-609, and v. 47, 1919, pp. 133-134.
- (4) ——— The dustfalls of March, 1918. *Mo. Wea. Rev.* 1918, v. 46, pp. 502-506.
- (5) ——— The great dustfall of March 19, 1920. *Am. Jour. Sc.*, vol. 3, 1922, pp. 349-364.
- (6) ——— The dustfall of February 13, 1923. *Jour. Agr. Res.*, vol. 29, 1924, pp. 443-450.

PETROLOGY OF THE GREAT DUSTFALL OF NOVEMBER 13, 1933

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Snow falling at Buffalo on the morning of November 13, 1933, was observed to be discolored. The depth of snow on the ground, including previous falls, was about 5 inches, but in order to avoid contamination only the top few inches of fresh snow was collected. This was melted, the liquid filtered, and the residue mounted in Canada balsam, and then examined, with polarized light, with the microscope.

The organic and inorganic substances present are:

Volcanic glass	Hornblende
Quartz	Diatom tests
Feldspar	Spores
Mica	Pollen
Tourmaline	Vegetable fibers
Zircon	

There are two kinds of volcanic glass in the dust. In transmitted light, one variety is colorless and contains inclusions, which may be either liquid or gaseous. The other variety is black, and suggests basaltic glass. The feldspar is unaltered. It consists of orthoclase, microcline, and plagioclase feldspar. These mineral grains are angular to subangular in appearance. The quartz and feldspars examined from the Buffalo dustfall are glassy clear and are not at all stained by iron oxide as were those in the Madison dustfall of 1918, concerning which Winchell and Miller (1) say "both the quartz and the feldspar are stained by limonite and hematite, and this condition seems to pervade the fragments so thoroughly that it is a condition of long standing." The mica is mainly muscovite, although a green variety present probably represents some form of biotite. Brown and blue colored tourmaline are present, as is colorless zircon. Both of these minerals are distinctly euhedral.

The hornblende is light green and possesses the characteristic prismatic cleavage of the amphiboles. While most of the mineral grains present are subangular to angular, a few minute, undetermined, colorless grains, showing abnormal berlin blue interference colors under

crossed nicols suggestive of vesuvianite or zoisite, are distinctly subangular or subrounded.

Winchell and Miller (2), speaking of the Madison dustfall of 1918, state that "microscopic measurements of the size of the particles show that they range from about 0.003 mm to 0.1 mm but a surprisingly large percentage falls within much narrower limits, namely, 0.008 to 0.025 mm." The range of the diameters or lengths of the Buffalo dust particles varies from 0.005 to 0.5 mm, while a large percentage of the dust averages 0.02 mm. A little of the dust was spread out on a black sheet of paper and it was seen that a few colorless grains were just large enough to be visible to the naked eye.

About 10 percent of the entire sample consists of organic matter. According to Mrs. Imogene Robertson, assistant curator of biology at the Buffalo Museum of Science, the organic matter consists of spores of microfungi, ferns, mosses, and encysted protozoans. The spores seen present a variety of forms and shapes. Some are spherical, others ovoid, still others distinctly elongated. These varishaped spores are some smooth, some pitted, and a few distinctly spinous.

According to Winchell and Miller, the Madison, 1918, dustfall consists mainly of feldspar, quartz, and diatom tests, with minor amounts of other constituents, and Twenhofel (3) suggests that the place of origin was the semiarid regions of New Mexico, Arizona, and adjacent States. The assemblage of organic and inorganic matter which composes the Buffalo grit, however, is characteristic for the most part of dried-up playa lakes and ponds or flood-plain areas.

REFERENCES

- (1) Winchell and Miller, The dustfall of March 9, 1918. *Am. Jour. Sc.*, v. 46, 1918, pp. 599-609, and v. 47, 1919, pp. 133-134.
- (2) ———, The dustfalls of March 1918. *Mo. Wea. Rev.*, 1918, v. 46, pp. 502-506.
- (3) Twenhofel, W. H., Treatise on sedimentation, Baltimore, 1932, p. 68.